The impact of mental health support for the chronically ill on hospital utilisation: Evidence from the UK

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Abstract

Individuals with common mental disorders (CMDs) such as depression and anxiety frequently have co-occurring long-term physical health conditions (LTCs) and this co-occurrence is associated with higher hospital utilisation. Psychological treatment for CMDs may reduce healthcare utilisation through better management of the LTC, but there is little previous research. We examined the impact of psychological treatment delivered under the nationwide Improving Access to Psychological Therapies (IAPT) programme in England on hospital utilisation 12-months after the end of IAPT treatment. We examined three types of hospital utilisation: Inpatient treatment, Outpatient treatment and Emergency room attendance. We examined individuals with Chronic Obstructive Pulmonary Disease (COPD) (n=816), Diabetes (n=2813) or Cardiovascular Disease (CVD) (n=4115) who received psychological treatment between April 2014 and March 2016. IAPT episode data was linked to hospital utilisation data which went up March 2017. Changes in the probability of hospital utilisation were compared to a matched control sample for each LTC. Individuals in the control sample received IAPT treatment between April 2017 and March 2018. Compared to the control sample, the treated sample had significant reductions in the probability of all three types of hospital utilisation, for all three LTCs 12-months after the end of IAPT treatment. Reductions in utilisation of Emergency Room, Outpatient and non-elective Inpatient treatment were also observed immediately following the end of psychological treatment, and 6-months after, for individuals with diabetes and CVD, compared to the matched sample. These findings suggest that psychological interventions for CMDs delivered to individuals with co-occurring long-term chronic conditions may reduce the probability of utilisation of hospital services. Our results support the roll-out of psychological treatment aimed at individuals who have co-occurring common mental disorders and long-term chronic conditions.

Keywords

Depression; Anxiety; Hospital utilisation; Psychological interventions; Chronic conditions

Introduction

The burden of common mental disorders (CMDs), that is depression and anxiety disorders, represents a major global challenge [1]. The World Health Organization estimates the world-wide prevalence of depression to be 4.4% (332 million people) and of anxiety disorders to be 3.6% (264 million people). In England, almost 16% of adults are estimated to report clinically significant symptoms of CMDs [2]. The associated burden of disease is considerable, with depression identified as the single largest contributor of all diseases to non-fatal health loss (7.5% of all years lived with disability) and anxiety disorders as the sixth largest [3]. Effective treatments for CMDs exist but access to such treatments is limited. Only 16.5% of people with depression world-wide receive even the minimum recommended treatment and the majority of those with depression receive no treatment [4]. Limited access to effective treatment is common in high income countries; for example, only 29% of adults identified with depression in the USA receive any treatment [5].

Antidepressants are effective treatments for depression and anxiety disorders and are widely used treatments [6, 7], but there are significant problems with adherence: some studies estimate over 70% of people prescribed antidepressants do not adhere to treatment [8]. Psychological therapies, such as cognitive behavioural therapy (CBT), have been shown to be effective in reducing symptoms of CMDs, with acute phase effects similar, and long-term effects potentially superior, when compared to pharmacotherapy [9, 10]. Furthermore, patients often express a preference for these therapies over medication [11]. As a result, psychological interventions have been increasingly recommended in international guidelines for CMDs [12–17] and initiatives have been launched to increase access to psychological interventions internationally [18–20].

Individuals with long-term physical health conditions (LTCs) have a significantly higher prevalence of CMDs [21–23]. LTCs, including common cardiovascular disorders, diabetes and respiratory disorders, are associated with functional impairments and the comorbidity between LTCs and CMDs are associated with worse prognosis for both the physical and mental health conditions [24, 25]. Healthcare costs are estimated to be around 50% higher for individuals with a co-occurring mental disorders compared to those with physical health disorders alone [26]. These higher costs are predominantly incurred for physical health services, including increased hospitalisation and a higher use of primary and secondary care consultations. Thus

one potentially important benefit of psychological treatment is its potential to deliver significant health cost savings for individuals with a LTC through decreased hospital utilisation. However, to date the evidence on the effectiveness of psychological interventions for CMDs in reducing physical health cost is limited [27, 28], although there is evidence for reductions in acute hospital care for individuals with severe mental illnesses in receipt of treatment through early intervention in psychosis services [29].

In 2008 the English National Health Service (NHS) established a large-scale national initiative, the Improving Access to Psychological Therapies (IAPT) program, to increase access to psychological treatment in England to meet the increasing burden of CMDs [30, 31]. In 2018 over one million adults were referred to IAPT services and more than half a million people received a course of IAPT treatment [32]. The average number of sessions was just below seven, and interventions were typically cognitive-behavioural in nature. IAPT has been shown to be effective in improving mental health outcomes [33] with an overall clinical recovery rate of over 50% for those who complete an episode of treatment, and nearly 70% reporting improvement in symptoms [32]. However, these results come from uncontrolled pre-post evaluations of services and mixed findings have been reported surrounding the cost-effectiveness of IAPT treatment [34–36]. The current national estimated cost per episode is £680 per patient, implying IAPT is cost effective as it is lower than the £750 per treatment course which has been estimated as part of the economic case for IAPT [37]. However, as nearly a third of patients referred to IAPT do not enter treatment [32] the potential cost-effectiveness of services as a whole may be reduced [34]. Nevertheless, the fact that the IAPT program has been able to provide accessible mental health treatment for large numbers of people in England has resulted in similar models being adopted in a range of other countries including Norway, Canada, Australia and New Zealand [19, 20].

Approximately 25% of patients receiving IAPT treatment report having a co-occurring LTC [38, 39]. IAPT patients with LTCs have lower recovery rates (3% lower) than patients without LTCs on average [39, 40], with poorer response especially noted in individuals with diabetes, chronic obstructive pulmonary disease (COPD) and musculoskeletal problems [41]. However, there has only been one study on the impact of standard IAPT treatments for patients with LTCs on hospital utilisation [42]. This study compared outpatient attendances as well as Emergency Room and inpatient admissions 6 months before and after referral to IAPT. A controlled before and after (Difference-in-Difference) design was used with IAPT referrals

compared with people not referred to IAPT, with cases matched on age, gender and GP practice. Whilst Emergency Room utilisation fell for the IAPT referred group compared to controls, changes in inpatient or outpatient use did not differ. Whilst this points to an immediate fall in use of hospital resources post-receipt of psychological therapies, the study has some limitations. These are the short follow-up period, the absence of information surrounding the mental health status of the control group, lack of matching on previous hospital use and coverage limited to only one healthcare region in England.

Given this paucity of studies, there is a need to extend our understanding of how psychological interventions such as those delivered by IAPT can affect hospital utilisation for a large and representative sample of individuals with LTCs. Ours is the first such study on a national level. Specifically, we use data for 4 years to examine whether IAPT treatment for individuals with CMDs who have LTCs resulted in changes in subsequent hospital use. We use national data and link one dataset on receipt and completion of IAPT treatment with another on hospital utilisation at the individual level. We examine patients with three common LTCs that account for a high proportion of healthcare costs [43], which are COPD, diabetes, and cardiovascular disease (CVD). These are currently experienced by around 2, 6 and 14 percent of the UK population respectively [44–46] (the rates are similar to other European prevalence rates). We focus on individuals who have more severe expressions of these LTCs as measured by receipt (prior to IAPT referral) of inpatient treatment for the LTC.

Method

Data Sources

We used two data sources. The first is hospital utilisation data from the Secondary Usage Services (SUS) dataset. The SUS dataset includes the National Admitted Patient Care data, a hospital discharge dataset covering all patients treated as inpatients by the NHS in England. It includes ICD-10 codes enabling identification of individuals with hospital utilisation for an LTC. The second dataset covers psychological treatment data provided by the IAPT program in England. This National IAPT dataset includes all patients treated by IAPT services in

England, and includes episode and appointment level information about the type and length of psychological treatment received for every individual, start and end dates of care, as well as patient-reported symptom severity scores. Both datasets contain a patient level unique identifier which enabled us to link the two datasets to identify individuals with LTC hospital utilisation (from SUS) who received treatment from IAPT (from the National IAPT dataset), as well as each episode of care within each dataset. We used monthly data from 1st April 2013 (the beginning of British fiscal year (f.y.) 2013/14) to the 31st March 2017 (the end of f.y. 2017/18). The datasets were linked by NHS Digital as part of an evaluation of the impact of IAPT for individuals with LTCs supported by NHS England, and provided as anonymous data to the research team specifically for this evaluation. More information about the SUS dataset is available from NHS Digital [47], as well as for the IAPT dataset [48].

Participants

Figure 1 shows the data sets, time periods and samples used in the analyses. To identify those with the relevant LTC, we identified all individuals who used inpatient hospital services for (at least) one of three LTCs (COPD, diabetes and CVD) in f.y. 2013 using ICD-10 codes available in the SUS dataset (see Appendix Table A1 for ICD-10 codes). Using the unique patient identifier, we identified all individuals in the National IAPT data set who also received IAPT treatment in f.y.s 2014-2017.

For our analyses, an individual was denoted as receiving IAPT treatment if they met the definition of a "course of treatment" used in national reporting of IAPT treatment [32, 38]. This is defined as having two or more sessions of IAPT treatment. This definition is selected because around 40-45% of individuals assessed by IAPT services only have one session of treatment. This could be brief advice and/or consultation and/or potentially referral to alternative services [49] due to sub-clinical presentations, or conversely, more severe and complex clinical presentations than routinely seen by IAPT. These individuals are not counted as receiving an episode of IAPT care in national reporting and instead are considered not suitable for IAPT treatment. We therefore follow this protocol and do not include them in the definition of treatment used in this study. Individuals receiving only one session or less (i.e. those who were only referred and not subsequently treated) were excluded from all analyses. We also excluded individuals who had no end of treatment date recorded (as we cannot assign the date at which the post IAPT change may commence) and individuals who received more

than one episode of IAPT treatment during the sampling period. The latter group account for a small proportion of those treated by IAPT (they are 10% of the initial dataset) and are likely to be different from the majority of IAPT users.

Treated individuals were defined as those who met the inclusion criteria and received an episode of IAPT treatment in f.y.s 2014 and 2015. As the control group, we used the pool of individuals who received IAPT (i.e. have the same inclusion criteria) in f.y. 2017. The control group therefore received IAPT after the treated group. This control group were considered the most appropriate with the available datasets, as the SUS datasets do not include data on mental health status in f.y. 2013 or any other year and therefore we could not match on mental health status. The fact that the control group had received IAPT indicated that they had significant mental health needs. While they received IAPT up to three years later than the treated group, evidence suggests delays seeking treatment for common mental disorders can average over a decade [50]. Therefore, we make the assumption that this control group are similar in both mental health status (which is unobserved) and physical health status to the treated group.

To further ensure that the treated and control individuals were as similar as possible, we matched the groups on sociodemographic, clinical and utilisation characteristics available in the f.y. 2013 SUS dataset (see below for the variables used in matching and on the matching method used). Potential drawbacks of this control group are discussed below in the limitations section.

We compared our treated sample (who required inpatient treatment for their LTC) to all patients who were treated in IAPT in the same time period as the treated sample (f.y.s 2014 and 2015) who *self-reported* having an LTC, defined by a positive response recorded in the IAPT datasets to a Yes/No variable. This comparison is presented in Appendix B, and show that our treated sample are older, live in more deprived areas and have poorer mental health than the average individual who receives IAPT treatment and self-reports as having a LTC. This is expected since our sample received inpatient care for their LTC and thus are individuals who are more likely to have greater severity of LTC.

We also identified a second potential control group. This was composed of all individuals who had an inpatient stay with a diagnosis of COPD, diabetes or CVD in f.y. 2013, but who did not receive IAPT at any time point. We examined this second control group to explore the potential

value of an alternative control group and to provide support for the appropriateness of the control group that was used in our analyses.

Outcome measures

The outcome measures are monthly utilisation of Emergency Room care, Outpatient visits and Inpatient stays (all episodes). Inpatient stays are further split into two mutually exclusive categories: elective (planned) and non-elective (admitted from the Emergency Room) stays. We define a dummy variable which takes a value of 1 if the patient used a hospital service in a given month in the three f.y.s 2014, 2015 and 2016 and is 0 otherwise. As the outcomes are monthly there are a minority of individuals with multiple episodes in any month. With the exception of outpatient visits less than 1% of individuals have multiple visits, implying that the use of a binary variable to denote admissions loses little information. For outpatient visits, around 10% of our sample have multiple visits within a month. We retained the dummy variable specification for the outpatient regressions to allow comparability of estimated effects across all of our models. For inpatient stays we examine an alternative specification of length of stay in our sensitivity analyses. We focus on inpatient stays for this as they are the most costly form of hospital utilisation.

Data analysis

Propensity score matching

Individuals treated by IAPT in f.y. 2014 and 2015 (i.e. our "treated" sample) were matched, using propensity score matching [51], to individuals who received IAPT in f.y. 2017 (the control pool). Individuals not on common support (for whom an appropriate statistical match could not be identified) were excluded, and we used 1:1 matching with replacement, allowing the same case to be used as a control for multiple treated individuals. We employed a narrow calliper of 0.001, but our matching results were not sensitive to the choice of caliper. Evidence of parallel trends between the treated and control group was sought by examining the level and trajectory of the utilisation of both groups in the f.y. 2013 i.e. prior to the period of our estimation of the effect of IAPT. Similar trends indicate that there are no pre-trends that affect one group and not the other. We also explore the trends in utilisation between the control group and individuals who received IAPT in f.y. 2016 (who are not included in the analyses presented in this study) to observe potential differences in trends.

The covariates used in the propensity score matching included sociodemographic, clinical and hospital utilisation variables derived from the 2013 SUS dataset. The following covariates were used in matching:

i) Sociodemographics including age and gender.

ii) Index of multiple deprivation (IMD) decile, a measure of small area economic and social deprivation of the home address of the individual at the Lower Super Output Area (LSOA) level (an area containing around 650 households).

iii) The number of ICD-10 comorbidities recorded in SUS records.

iv) Count of utilisation in f.y. 2013 of hospital services, separately for each of Emergency Room visits, outpatient visits and inpatient stays.

v) Which of 211 local administrative organisations responsible for commissioning healthcare services the individual resides in. These Care Commissioning Groups (CCGs) cover a geographic population of on average 226,000 people [52, 53]. Inclusion of CCG allows the model to control for provider of the IAPT services (which are commissioned at the CCG level) and for differences in policy and resources at local level.

Modelling the impact of IAPT on utilisation

We estimated the impact of IAPT treatment on hospital utilisation as the difference in the change in the probability of use, at the monthly level, of hospital utilisation before and after the end of IAPT treatment for the treatment and control group. We estimated each type of hospital utilisation separately for each of the three LTCs. Full details and justification of the modelling approach are presented in Appendix C, and are described briefly here.

A difference-in-difference designed was employed, exploiting the staggered timing of when individuals finish their IAPT treatment. Individual fixed effects and month by year fixed effects (a similar approach is Koenig et al. [54]) were included to control for time-invariant characteristics (including IAPT provider) and to account for common seasonal effects and time trends. Pooled data of treated and controls for f.y 14/15, 15/16 and 16/17 was estimated as:

$$Use_{scit}=b_s\, IAPT_{it-n}+T_t\lambda_s+ I_i\, \delta_s \; + e_{scit}\,,\;\; t=1,\ldots,36 \qquad (1)$$

for each of the three LTCs. Use_{ict} equals 1 if individual i in CCG c uses hospital service s in month t and 0 otherwise. T_t are set of time fixed effects that allow for both common seasonal effects and time trends. We use 36 dummy variables (one for each month of the three-year estimation period) and I_i are a set of individual fixed effects allowing individuals to act as their own comparison, meaning patient level variables (i.e. those included in the matching) were controlled for. $IAPT_{it-n}$ denotes whether person i has completed IAPT treatment in month t-n and is time-varying at the individual level. In our main analysis n was defined as 12 months (i.e. 12 months after finishing a course of treatment) with the 12-month lag was chosen to allow for a longer follow up than in earlier research. It also avoids counting hospital treatments that had been scheduled before, but took place after, the start of IAPT treatment. In additional analyses we also examine hospital utilisation changes immediately after (0 months) and 6 months after the end of IAPT treatment. Standard errors were clustered at the individual level. The model used was a linear probability model, with the estimated coefficient for the effect of IAPT treatment being the percentage point change in the probability of any usage of each type of hospitalisation (Emergency Room, outpatient, inpatient) following IAPT treatment. Additional analysis with length of stay (LOS) as the outcome was also performed.

As a supplementary analysis to examine the underlying mechanism through which any significant differences arise between the treatment and control group in hospital utilisation 12 months following IAPT treatment, we compared the mean number of episodes for each service (Emergency Room, inpatient and outpatient) pre- and post IAPT. The pre-year is defined as the first year in which any of the treated finished IAPT. This is f.y. 2014, which is not included in our main analysis as a treated period since we examine the effect 12 months after the end of treatment. The post-year is f.y. 2016, which is when all treated observations have finished their IAPT course. All tests of statistical hypotheses were assessed at a two-sided 5% level of significance.

Results

Propensity score matching estimates

All controls (future IAPT users) were on common support but a number of the treated observations (337, 162 and 208 for COPD, Diabetes and CVD respectively) were off-support

and excluded from the analysis samples. The final samples consisted of 816 treated and 423 controls for the COPD sample, 2813 treated and 1350 controls for the diabetes sample and 4115 treated and 1785 controls for the CVD sample. Sample flow diagrams are presented in Appendix Figures C1-3.

Evidence of parallel trends between the treated and control groups is presented in Appendix Figures D1 to D9 which show both groups utilisation trends for f.y. 2013. These figures show the 95% confidence interval for the utilisation of the two treated and controls is overlapping, implying that the pattern of utilisation for the treated group as compared to the control across all three LTCs and secondary care type is identical in 13/14. The only exception is A&E for CVD patients in three months (October 2013, November 2013 and January 2014). Given all the other months show no difference in utilisation between treated and controls, we view these as outliers and take the patterns shown in these tests as supporting the assumption of parallel trends and our estimation strategy. Balance between the treated and control groups that are used in the analysis on matching variables is presented in Appendix Tables E1-E3 and shows balanced was achieved.

We also compared the utilisation of the control group with individuals who received IAPT in f.y. 2016. Individuals in this group received IAPT one year earlier than the control group. This 'treated but not analysed' group has treatment close in time to the control group and thus should be similar to the control group in unobserved mental health status as well. These analyses (Appendix Figures D10 to D18) also show no notable differences in levels or trends between two groups.

Impact of IAPT on hospital utilisation

Table 1 shows the estimated percentage point change in the use of each hospital service for each LTC 12 months after the end of IAPT treatment.

Panel A presents the results for COPD. There are significant falls in the probability of Emergency Room, outpatient and (all) inpatient utilisation 12 months after treatment. Relative to the average monthly probability of utilisation in f.y. 2013 (before IAPT treatment), the estimated effects imply a decrease in utilisation of around 20% for Emergency Room and

inpatient elective use for those who received IAPT. The implied decrease for outpatient use is about 14%.

Panel B presents the results for diabetes. There are significant falls in the estimated percentage point change in use of all services, other than elective inpatient use 12 months after the end of treatment. Relative to the average monthly probability of utilisation, the estimated effects imply a decrease in utilisation of around 22% for Emergency Room, and around 10% for outpatient and any inpatient use.

Panel C presents the results for CVD. The pattern is very similar to that for diabetes. There is a significant fall for all services, with the exception of elective inpatient use, 12 months after the end of treatment. For CVD the largest falls are for Emergency Room and for non-elective inpatient stays. These falls are all over 20% and, in some cases, closer to 30% relative to the average probability of utilisation.

These results show that 12 months after the end of IAPT treatment there was a significant fall in the probability of hospital use and one that is large relative to mean use before treatment commenced. There are two possible drivers of these significant falls. The first is that IAPT treatment caused those who received it to use fewer services. The second is that IAPT treatment services interrupted an upward trajectory in the utilisation of health services for these individuals while the control group continued on this upward trajectory.

We examined this by looking at the changes in utilisation in the raw data, pre-and post-treatment, for the treated and the controls respectively. For this analysis we designated f.y. 2014/15 as pre-treatment and f.y. 2016/17 as post-treatment.

Figure 2 shows the change in the mean number of visits in f.y. 2014/15 and 2016/17 with 95% CIs respectively for Emergency Room, inpatient visits (all), and outpatient visits, for the treated and the controls by each condition. The first block of 3 pairs is for COPD, the second for diabetes and the third for CVD. Figure 2 shows that, for all three services, there is an increase in use by the control individuals between f.y. 2014/15 and 2016/17. These increases are mostly significant, with the exception of inpatient and outpatient visits for COPD and CVD respectively. For the treated, there are small falls in Emergency Room use for all three conditions, which are only statistically significant for CVD patients. There are no significant

changes in inpatient use for diabetes and COPD and a small but significant decrease for CVD treated patients. In contrast, there are large decreases for the treated in outpatient use for all three conditions.

The difference in the changes in utilisation between the treated and the controls in Table 1 are thus driven mainly by increased usage of all three services by the control group and a drop in outpatient use by the treated. We infer that this shows that IAPT treatment halted an upward trajectory in hospital service utilisation for Emergency Room and inpatient services. For outpatient services it reduced use for the treated relative to the controls.

Sensitivity analyses:

In Appendix Table F1 we examine the impact on the probability of utilisation immediately after the end of IAPT treatment (0 months) and 6 months after the end of treatment. For comparison we also present our specification of 12 months after the end of IAPT treatment. All estimates show a negative effect of IAPT on the probability of all types of utilisation. Comparison of the estimated effects across the three different post-treatment windows show that these effects mainly increase as time post-treatment increases. Thus focusing on utilisation immediately after the end of IAPT treatment will underestimate the positive impact of IAPT on reducing use of hospital care.

To assess our choice of control group, we examine all individuals who had a LTC that required hospitalisation in f.y. 2013 but who did not receive IAPT between 2013-2018 (i.e. never received IAPT in any study period). This sample were systematically different on observable characteristics from the treated sample and balance was not achieved on covariates across a range of matching algorithms. In addition, we could not produce any evidence for these groups that the parallel trends assumption was satisfied. In contrast, our control group achieved balance on the same covariates (Appendix Tables E1-E3), and show evidence of parallel trends (Appendix Figures D1-D9). We document the estimates using this alternative control group in the first columns of Appendix Table G.1 for completeness.

Table G.1 also presents estimates for our treated and control samples with no individual fixed effects (final columns). These also show that IAPT treatment decreases overall hospital utilisation across the three LTCs.

We examine length of stay (LOS) for inpatient episodes as a further dependant variable (with day cases set to one day). These estimates are in Appendix Table H.1. They are negative but statistically significant only for CVD. While this could be used to infer that this suggests that IAPT treatment mainly reduces day cases for diabetes and COPD and all LOS for CVD, we are cautious about this interpretation as modelling a count variable with an extreme tail (which is the case for our LOS variable) using ordinary least squares (OLS) has consistency problems. We therefore focus on the linear probability model (LPM) estimates in Table 1.

Discussion

This is the first national study to explore the impacts of IAPT treatment on hospitalisation. We used linked national data to identify patients with (at least one of) three common LTCs that required hospitalisation who also received IAPT, to explore whether IAPT treatment was associated with later decreases in hospital utilisation. Specifically, we looked for declines 12 months following the end of IAPT treatment. The findings indicated that the probability of hospital usage of Emergency Room, Outpatient and Inpatient services 12-months after the completion of IAPT treatment is lower compared to matched controls who received IAPT after the study window. Reductions were largest in Emergency Room visits and non-elective inpatient stays. We draw similar conclusions if we examine differences immediately (0 months) and 6 months after IAPT treatment ends.

Whilst previous reviews have suggested there is limited evidence for the positive impact of psychological treatment on healthcare utilisation [27, 28], this study provides additional support for the potential benefits of mental health treatment on physical health use using data for the whole of England. An earlier study found that Emergency Room utilisation decreased following use of IAPT services [42] in one region of England. In the present study we also find that inpatient and outpatient use decreases for individuals with the three common LTCs we examine. Potential reasons for differences in findings may be the result of differences in design. This earlier study [42] had only a 6 month follow-up period and we show that decreases in utilisation are increasing in the time elapsed after the end of treatment. Our study also has many more variables to match treatment and controls, including previous hospital utilisation which was not used in the previous study.

Strengths and limitations

A strength of our study is linkage of hospital utilisation data to IAPT data for all of England. This enabled us to examine the effect of IAPT on hospital use for an important group of individuals with LTCs and CMDs, and for our results to apply to all relevant patients in England and to all NHS hospital and all IAPT providers. Earlier analysis that focused on the effect of IAPT treatment for individuals with LTCs on health service use have only been able to examine patients in small geographical area of England [42]. A second strength is that we are able to examine the impact of IAPT 12 months after the end of treatment as well as immediately after the end of treatment. Previous studies exploring the impact of IAPT treatment on healthcare utilisation have not had access to longer-term utilisation data, including those using samples identified as having LTCs [42].

There are a number of limitations of the current study. First, the healthcare utilisation data was available for only four years so that, even using the population of patients who used NHS hospital services, samples were relatively small when we focused on specific common chronic conditions. Second, to examine on the effect of IAPT on hospital utilisation 12 months after the end of treatment with as large a sample as possible, the treated group were defined as those who had IAPT in f.y.s 2014 and 2015. We examined utilisation in the years following treatment including 2016 as this last year provides information on hospital use 12 months after the end of treatment for those treated sometime in 2015. Our "wait list" design uses a control group of individuals who received IAPT treatment but after the treated sample. As 2016 is a year for which we examine outcomes, we could not define this sample using data before f.y. 2017. This means the control sample, whilst having the same hospital utilisation criteria to define their chronic condition as the treated sample, were untreated by IAPT for longer than the treated group. This may mean their mental health trend was systematically different to the treated sample in ways we cannot observe with the data available in the matched data sets.

Two comparisons of levels and trends prior to treatment for this control group indicated that their pre-IAPT treatment hospital utilisation trends were similar to the actual treated sample and also to a set of individuals who received IAPT a year earlier than the controls (in f.y. 2016). This indicates that, absent of IAPT, the trajectories of use for the controls and the treated would be expected to be the same. Based on this, we assume that individuals who receive IAPT later are similar to those who receive it earlier. Although the available data meant we could not confirm similar mental health status in f.y.2013, the trajectories of healthcare utilisation

suggest similarity. However, the windows for these comparisons are only one and two years in length respectively. Ideally we would like a longer time window to test for common trends. We would also like to have better data on mental health status that can be used as a control to allow for potential differences in the evolution of mental health for the treatment and control group that may affect hospital utilisation. While IAPT data does contain good information on mental health status, it is not available before individuals are referred to IAPT so cannot be used to examine, or control for, trends in mental health prior to receipt of IAPT treatment.

Third, the data we use does not capture use of out-of-hospital services, such as antidepressant prescriptions, GP visits, and use of alternative mental health services. A recent study [55] was able to examine this for three areas in the UK and found decreases in costs of services delivered in the community setting. If there is no substitution between community and hospital based services, then our estimates are an underestimate of the impact of IAPT on use.

Fourth, our analysis examines individuals who had an inpatient stay in f.y. 2013 with an LTC code of COPD/diabetes/CVD. These individuals are not representative of IAPT users who self-report having an LTC, but are older, live in more deprived areas and have poorer mental health than the average individual who receives IAPT treatment and self-reports as having a LTC (this is shown in Appendix Tables B1 and B2). They also, by definition, have a more severe LTC than the average person with an LTC, given they have experienced a hospitalisation. Whilst this means that the study is not externally valid for all individuals with LTCs, it is those individuals with severe LTCs who are the most costly to the healthcare system. Thus understanding whether these individuals have reductions in hospital use post-IAPT treatment is relevant for discussions as to whether IAPT can be beneficial for this group.

Finally, we only included patients who received two or more sessions of IAPT treatment, following the definition of IAPT treatment used in national reporting [32]. This means that our estimates recover a “treatment on the treated” effect. An alternative approach would be to use an “intention to treat” (ITT) design i.e. to include all those referred to IAPT in the treated sample. We chose not to do this because many individuals who attend only one session are designated by IAPT providers to be unsuitable for IAPT treatment. But this group may contain some non-compliers: individuals who are suitable for IAPT but choose not to attend more than the initial assessment session. Given this, we would expect that an ITT design would show a lower impact on utilisation because the non-compliers and the non-suitable would be included

in the treatment group. We also exclude individuals who had more than one episode of IAPT treatment within the sampling period. Therefore our estimates are not generalizable to all IAPT users. Whilst our selection has allowed for balanced matching with controls, we cannot say what direct of bias this second exclusion will impart. It could be that IAPT treatment is less effective for this group which means the impact on hospital utilisation is less. Alternatively, this group may be more likely to seek mental health treatment as they know their mental health is linked to deteriorating physical health and therefore they engage with IAPT to reduce anticipate physical healthcare needed.

Policy Implications

Our findings have important implications for the newly developed Integrated-IAPT initiative, a programme to expand IAPT treatments to people with co-occurring mental and physical health issues by co-locating physical and mental health care [56]. A recently published analysis of three local services that were part of this Integrated-IAPT programme demonstrated secondary care hospital utilisation cost savings following IAPT delivered interventions [55]. Our analysis is a national study and uses data from all providers of IAPT services. Our findings show a significant fall in the probability of use of hospital services for those who have co-existing LTCs that required Inpatient treatment, at this national level. These individuals are a target groups for the integrated programme and thus our findings provide further support for this Integrated-LTC programme approach.

Our analysis also indicates the need to link data sets that contain information on both mental and physical health to evaluate the impact of interventions for those with both physical and mental health conditions. Mental health status is not routinely collected in the NHS hospital discharge dataset that is widely used by researchers (the Hospital Episodes Statistics Data, HES) or that used here (SUS). Thus mental health status, as discussed above, cannot be measured well in data that examines hospital utilisation. This means that linkage is needed if the impact of community interventions designed to improve health outcomes and/or lower costs is to be assessed, as no single data set that is currently available in the UK allows this at a national scale. One obvious potential linkage is to family doctor (General Practice) records where mental health screeners such as the Patient Health Questionnaire-2 (PHQ-2) [57] or formal diagnoses of mental health conditions may be recorded, as well as prescribing data. This has been undertaken locally at present, but to get large enough sample sizes to focus on particular chronic conditions, national linkage is needed.

Conclusion

Our findings suggest that the receipt of psychological treatment is associated with a reduction in hospital utilisation, supporting previous findings [27, 28, 55]. Larger effects are observed 12-months after the end of treatment but we show significant decreases also immediately after (0 months) and 6 months after the end of IAPT for diabetes and CVD. These positive effects may be linked to an improvement in mental health and the ability to better care for the LTC [27]. Given around 25% of patients using IAPT services self-report an LTC [38, 39] our findings suggest that the benefits of IAPT treatment may stretch further than positive 'recovery' rates and spillover into reduced use of physical healthcare. Our findings provide support for the potential for interventions targeted at patients who have both CMDs and long term physical conditions, specifically COPD, Diabetes and CVD, to reduce healthcare utilisation [27–29]. In the UK context they support the recently developed Integrated-IAPT programme which extends IAPT to individuals with co-occurring mental and physical health issues [58]. A recently published analysis of three sites involved in the Integrated-IAPT programme have demonstrated secondary care hospital utilisation cost savings [55]. Our current findings provide a national picture and support the potential role of the Integrated-LTC programme to reduce hospital utilisation.

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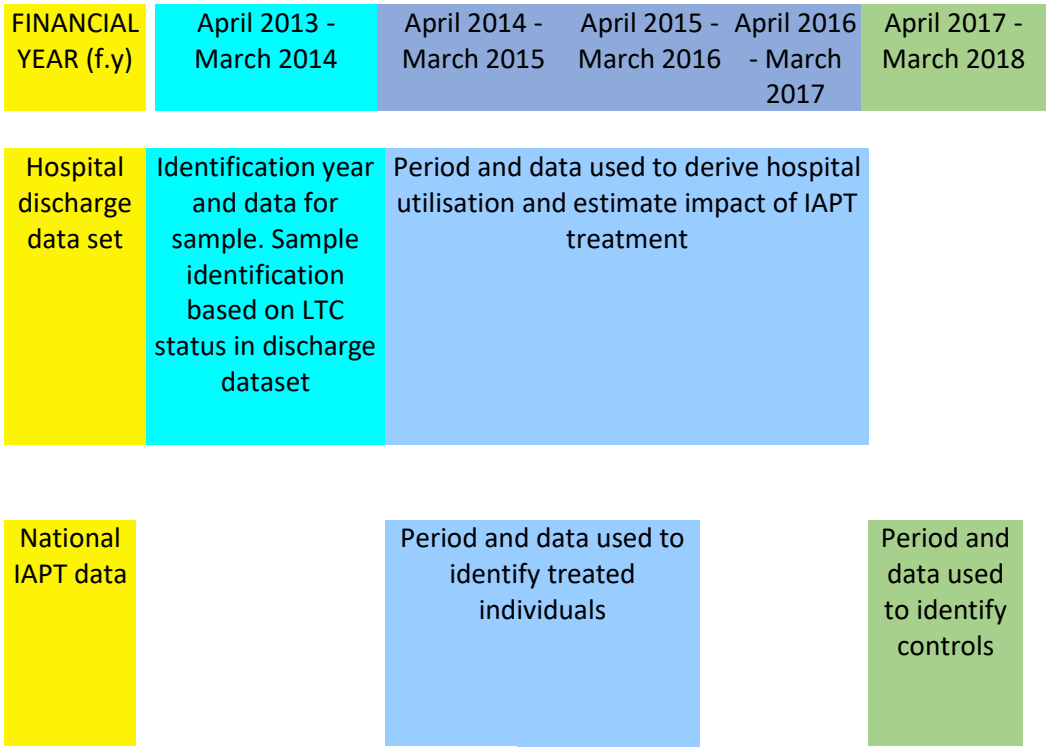
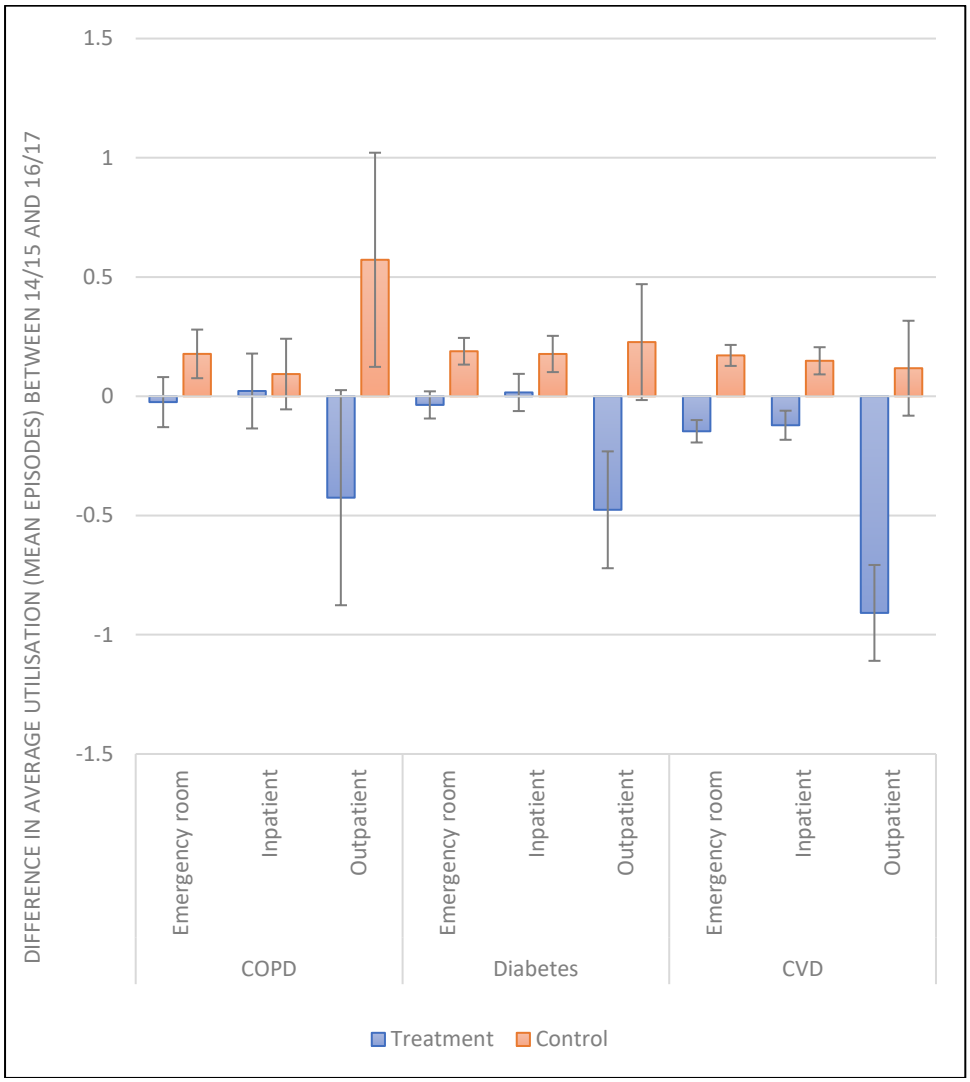
Figure 1: Study Design and Sample selection



Notes: COPD/diabetes/CVD diagnoses identified in the hospital discharge (APC 2013/14) dataset. Any of these patients who received IAPT treatment in f.y. 2014 or 2015 were designated as treated. Controls were those who did not receive IAPT treatment in this period but received IAPT in financial year 2017. The analysis examines hospital utilisation over the three financial years 2014 – 2016.

Figure 2: Unadjusted utilisation differences



Notes: Raw average annual utilisation difference (14/15 vs 16/17) for both the treated and control groups. Bars indicate 95% confidence intervals.

Table 1: Estimated change in the probability of hospital use after IAPT treatment

Hospital service	Emergency Room		Outpatient		Inpatient		Inpatient: elective		Inpatient: non-elective	
	Estimated percentage point change in use after IAPT treatment	Reduction in probability of use evaluated at the mean	Estimated percentage point change in use after IAPT treatment	Reduction in probability of use evaluated at the mean	Estimated percentage point change in use after IAPT treatment	Reduction in probability of use evaluated at the mean	Estimated percentage point change in use after IAPT treatment	Reduction in probability of use evaluated at the mean	Estimated percentage point change in use after IAPT treatment	Reduction in probability of use evaluated at the mean
Panel A: COPD (N = 1239)										
12 months after IAPT	-0.011 (-0.021, -0.001)	-19%	-0.042 (-0.067, -0.018)	-14%	-0.012 (-0.023, -0.001)	-19%	-0.008 (-0.016, 0.001)	-23%	-0.004 (-0.011, 0.003)	-13%
Panel B: Diabetes (N= 4172)										
12 months after IAPT	-0.012 (-0.018, -0.007)	-22%	-0.032 (-0.044 ,-0.019)	-10%	-0.006 (-0.012, 0.000)	-10%	0 (-0.005, 0.005)	0%	-0.007 (-0.011, -0.003)	-28%
Panel C: CVD (N = 5900)										
12 months after IAPT	-0.016 (-0.021, -0.012)	-28%	-0.035 (-0.046, -0.024)	-12%	-0.011 (-0.015, -0.006)	-22%	-0.004 (-0.007, -0.001)	-14%	-0.007 (-0.010, -0.004)	-29%

Notes: 95% Confidence intervals are presented in brackets. Estimates are marginal effects from linear probability models with fixed individual effects on the treated and matched control sample, indicating estimating change in the monthly probability of utilisation. Models include controls for month*year effects. Individual and area covariates are absorbed by fixed effects. The reduction in the probability is use is take from the average monthly probability of use is calculated from utilisation data. The estimates in each panel allow for a treatment effect 12 months after treatment to allow for a lag. The estimates use the same sample of treated and controls